

INTRACRANIAL ABSCESS DUE TO THE TYPHOID BACILLUS.

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THE great dangers in fractures of the skull, either of the vault or base are, of course, in the early days following injury, (1) haemorrhage either extradural or cerebral and (2) laceration of the brain tissue. Should the time of onset of symptoms due to either of these causes have elapsed, or should operative interference in the meantime have been called for, the temperature chart is carefully watched for evidences of infection at the site of the injury.

Infection may gain entrance to the intracranial cavity through one or more of several channels if the integument and underlying tissues have been lacerated or incised the ordinary organisms from the surface of the body or the air may have easy entrance. A similar portal of entry is afforded by any operation not performed under strictly aseptic precautions. Again the fracture may extend through the bone to one or other of the cranial cavities which communicates with the exterior, such as the nose and ears and their adjacent air cells, or the mouth, which normally contain pyogenic micro-organisms. Another source of infection is by the blood stream. That this form of infection does not more frequently occur is due in part to the fact that patients suffering from the various forms of bacteriæmia do not often receive fractures of the skull. The coincidence of these two misfortunes to the subject of our note was sufficient to induce the unique condition which we are about to describe.

Circumscribed abscess formation in the bones or soft tissues during and following attacks of typhoid fever are not infrequent. In all pyogenic infections local death of the cells due to trauma or other cause undoubtedly acts as a predispos-

ing factor. Abscesses in the coccygeal region are not uncommon as a complication of typhoid fever, a condition, doubtless, due to the invasion by the *B. typhosus* circulating in the blood, of an area where the cells have been injured by pressure. Cases have been reported of periostitis of the tibia in individuals suffering from an unsuspected ambulatory attack of typhoid fever in which a correct diagnosis was only determined by the bacteriological examination of the exudate and blood.

There appears to be in the light of our own case, a reasonable excuse for the suggestion that the occurrence of periostitis of the ribs in typhoid, treated by baths, may be the result of slight trauma received in the handling necessitated by such procedure. This case also demonstrates the presence of an unusual factor which may complicate injury or perhaps even operative procedure, namely, subsequent infection of a blood clot through the circulation.

C. S., aged 25, a machinist, was admitted June 23, 1907, to the Montreal General Hospital, under the care of Dr. Blackader, attending physician, and to his courtesy we are indebted for the medical notes of the case. Very little history could be made out as the patient was stupid and drowsy and his friends apparently knew little about him. It was established that one month previous to admission, in a drunken brawl, the patient had been struck on the right side of the head with a club, and had had a lump on that side of his head ever since. No recent history of injury could be obtained.

Complaints upon admission: headache, constant and severe for eight days; loss of appetite and drowsiness. Patient gives no history of chills, no diarrhoea. He has always been healthy and strong but has used alcohol to excess for years.

Present condition: Patient is of middle age, fairly well nourished, of only fair intelligence. He is very drowsy, but can be roused to answer questions more or less intelligently. Temperature 101° F. Respirations 25. Pulse 72, regular, small volume, low tension. Mucous membranes, nails and palate are of good color. Tongue is coated and dry, teeth are covered with sordes, breath is foul.

The abdomen is normal in contour, there are no rose spots,

spleen is apparently enlarged but not palpable. There is no glandular enlargement palpable.

Respiratory and circulatory systems are practically normal with the exception of a few rales heard all over the chest.

The left eyelid is ecchymotic and slightly oedematous. The right upper lid is discolored but not swollen.

On the right side of the head, above and in front of the ear and extending forward to the supraorbital ridge, the scalp is oedematous, red and tender over an area the size of one's palm. In the right parietal region, towards the posterior part of this area, there appears to be a depression in the skull with an indefinite raised edge. There are also abrasions over the left shoulder and right thigh. There are no subconjunctival haemorrhages and no evidence of bleeding from the ears, nose or pharynx. There is no proptosis.

Pupils are of medium size, equal and active to light and accommodation.

There is no paralysis or paresis, no sensory disturbance.

Reflexes: knee jerks are absent, abdominal is absent. A bilateral Kernig's sign is present. There is a stiffness of the posterior muscles of the neck. Patient has incontinence of urine at times.

Diary: June 25, two days after admission, patient has a positive Widal reaction in a dilution of one in eighty and a positive Ehrlich's diazo reaction in the urine. A lumbar puncture performed removes 32 c.c. of clear fluid not apparently under tension. Smears and cultures reported negative. Blood count shows 5000 white cells. During the five days following his admission, patient's condition changed but little. The swelling on the scalp became softer and apparently contained pus. On June 28, the patient was transferred to the surgical side and Dr. Elder at once operated.

Operation.—Under chloroform an incision was made over the softest part of the swelling. About 60 c.c. of pus and blood escaped exposing bare bone. The abscess cavity was curetted and irrigated. This procedure exposed a linear fracture of the parietal and frontal bones extending across the line of incision. The bone behind the fracture was depressed. The skull was trephined over this fracture and when the button of bone was taken out, a somewhat organized blood clot was seen overlying the dura under the

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1902

depression. About 2 c.c. of pus were seen spread out as a thin film over the surface of this clot. With the fingers in the trephine opening this blood clot, apparently about 150 c.c., could be felt to be forcing in the dura. The depressed pieces of skull were elevated and the trephine opening enlarged with rongeur forceps. The clot was then broken up with the finger, the cavity irrigated thoroughly with hot saline solution and packed with strips of iodoform gauze. The wound in the scalp was closed with silk-worm-gut sutures, save where the end of the gauze protruded, and a dry dressing applied.

Following operation the patient's temperature remained continuous in type and moderately high. He was kept on typhoid regimen and his fever gradually dropped to normal during the third week after operation. (See temperature chart.) There were no rose spots at any time and the spleen was never palpable. The patient was discharged well four weeks after operation, and so far as we know, has since remained well and shows no brain symptoms.

Bacteriological report: B. 07,—423, C. S., aged 25, June 28. The pus from the infected haematoma of the scalp planted upon blood serum develops in 24 hours a profuse growth of a motile bacillus which when stained by Gram's method and examined microscopically corresponds in morphology and staining reaction to the typhoid-colon group. The organism grown in dextrose agar gelatine semi-solid mixture, produces a heavy cloud without gas formation. Neutral litmus milk is turned a delicate lilac color after twenty-four hours. Dextrose and mannit litmus serum water media are first changed red and subsequently coagulated. Saccharose and lactose are not fermented. The blood serum from a patient in the third week of typhoid fever agglutinates this organism in a dilution of one in eighty.

TABLE I.

*Organism B. 07.423	Dextrose semisolid.	Neutral litmus milk.	Dextrose serum water.	Lactose serum water.	Mannit serum water.	Saccharose serum water.
	No gas. Diffuse turbidity.	No coagu- lation; lilac col.	Coagulat- ed.	No change.	Coagulat- ed.	No change.

* Agglutinated by immune serum in dilutions 1-40 and 1-80. Careful seedings of the material from both the subdural and the extradural

From the pus in the intracranial abscess is isolated an organism in pure culture which is similar in every respect to that isolated from the haematoma of the scalp. A blood culture was taken on June 28 and an organism isolated in the bile medium corresponding completely with that found in the head.

The microscopic examination of the blood clot shows a slight attempt at organization and a well marked infiltration with polymorphonuclear leucocytes.

The interest in this case lies in the fact that here we had a patient who was undoubtedly suffering from typhoid fever, exhibiting such well marked focal symptoms that it was possible to diagnose a brain lesion which was probably connected with the blow received some weeks before he came to the hospital. But what was the relation between the two? If his cerebral symptoms were due to haemorrhage why had they been so long delayed? If due to acute encephalitis complicating typhoid fever why were they localized? So far as we could determine there had never been a compound wound and hence direct infection *ab extra* could be excluded.

The result of examination and treatment proved that both these factors had contributed to the condition, viz., the blow caused the blood clot which the typhoid bacillus infected and so an abscess developed. Whether the bacillus was present in the blood at the time of injury or whether the typhoid fever developed subsequently is difficult to say. It is probable that if the injury of one month previous to admission was the cause of the fracture, the invasion of the body by the bacillus *typhosus* occurred after the injury. There is, however reason for suspecting that a more recent accident must have been the cause of the fracture, especially as the ecchymosis of the eyelids and abrasions of the limbs were suggestive of a more recent injury.

At operation it was thought that, possibly, the fracture extended through the frontal bone into the frontal sinus and

pus collections upon blood serum and agar were made in a series of tubes and in all there was obtained a pure culture of *B. typhosus*.

that by this channel the infecting agent had gained entrance. The bacteriological examination, however, corrected the idea and proved that the infection was through the blood current and not from the frontal sinus.

For permission to publish the clinical notes of this case we are indebted to Drs. Blackader and Elder of the attending staff of the Montreal General Hospital. We wish, also, to thank Dr. Lyman for help in the preparation of the medical notes of the case.